REMARKS

Claims 1-9 are pending and stand rejected. Claims 1 and 4-6 have been amended. Claims 2 and 3 have been canceled. Reconsideration and allowance of Claims 1 and 4-9 in view of the above amendments and following remarks is respectfully requested.

The Rejection of Claims 1-5 and 7-9 Under 35 U.S.C. § 102(a)

Claims 1-5 and 7-9 have been rejected under 35 U.S.C. § 102(a) as being anticipated by Akamatsu et al. (Eur. Phys. J. D 24, pp. 377-380, 2003). Withdrawal of the rejection is requested for the following reasons.

The Office Action states that the cited reference teaches a method for forming a composite film of nickel nanoparticles and polyimide and includes the steps of treating a polyimide film with aqueous potassium hydroxide to form carboxyl groups on the polyimide film, contacting the film with nickel ions to adsorb to the polyimide film, and thermally reducing the film in hydrogen gas to produce a metal nanoparticle composite film. The Office Action further states that the cited reference teaches that the size of the nanoparticles (volume filling ratio and thickness of the nanoparticle layer) is controlled by the heat treatment step. Applicants respectfully disagree with the Examiner's reading of the cited reference in this regard.

Claim 1 has been amended to clarify the invention. Claim 1 has been amended to recite that the method's thermal reduction treatment in a reducing gas (step c) is carried out at temperature not lower than the reduction temperature of the metal ions, and to further recite a second heat treatment (step d) at temperature different from the temperature of the first heat treatment.

Claims 2 and 3 have been canceled. Claims 4, 5, and 7-9 depend from Claim 1.

Applicants submit that, because the cited reference fails to exactly describe the invention as now claimed, the cited reference is not anticipatory. Withdrawal of the rejection is requested.

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The claimed invention is also non-obvious in view of the cited reference. The Akamatsu et al. reference describes a process for preparing a polyimide thin film containing nickel nanoparticles where the thickness of the modified polyimide film, as well as the amount of adsorbed nickel, can be controlled by experimental conditions. The cited reference clearly teaches that the amount of adsorbed nickel can be controlled by the time, potassium hydroxide concentration, and temperature during the potassium hydroxide treatment step, and by pH during the ion exchange reaction step (i.e., adsorption of nickel). However, the cited reference provides no teaching regarding controlling the properties of the polyimide films through the heat treatment step (annealing in hydrogen atmosphere subsequent to incorporation of nickel into the modified polyimide surface). Therefore, contrary to the Examiner's statement, the cited reference does not describe a method where the volume filling ratio of the metal nanoparticles in the composite film is controlled by regulating the thickness of a nanoparticle dispersed layer formed in the polyimide resin film with the thermal reduction treatment, as recited in the claimed invention.

Furthermore, the cited reference teaches away from the invention as now claimed, which recites a method that includes two heat treatment steps. At page 379, column 1, last paragraph, the cited reference states:

> Heat treatment at 300 °C results in formation Ni nanoparticles inside the modified layer, in which the nanoparticles disperse uniformly and isolated individually. Selected-area electron diffraction pattern exhibites [sic] Debye-Sherrer rings of Ni fcc phase, as shown inset in Figure 4b. This thermally- and hydrogen-induced formation was accelerated with an elevation of temperature as well as with increasing adsorbed Ni ions, i.e., <u>further high temperature (350 °C) caused the growth of the nanoparticles</u>. No particles or clusters were detected inside the modified layer after heat treatment below 200 °C. (Emphasis added.)

Because the cited reference fails to teach, suggest, provide any motivation to make, or otherwise render obvious the invention as now claimed, and because the cited reference teaches

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away from the invention as now claimed, the claimed invention is non-obvious in view of the cited reference.

The Rejection of Claim 6 Under 35 U.S.C. § 103(a)

Claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Akamatsu et al. reference in view of U.S. Patent No. 7,029,773, issued to van de Veerdonk et al. Withdrawal of the rejection is requested for the following reasons.

Claim 6 depends from Claim 1 and recites that, in a process having a second heat treatment, the second heat treatment is performed in an inert gas.

The deficiencies of the teachings of the Akamatsu et al. reference noted above with regard to Claim 1 are not cured by the teaching of the van de Veerdonk et al. patent. The van de Veerdonk et al. patent relates to a method and system for magnetic recording that utilizes a magnetic recording media having self-organized magnetic nanoparticles. Neither of the cited references describes a method for producing a metal nanoparticle composite film that includes two heat treatment steps, as in the invention as now claimed.

Because the cited references, either alone or in combination, fail to teach, suggest, provide any motivation to make, or otherwise render obvious the invention as now claimed, and because the Akamatsu et al. reference teaches away from the invention as now claimed, the claimed invention is non-obvious in view of the cited reference. Withdrawal of the rejection is requested.

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CONCLUSION

In view of the above amendments and foregoing remarks, applicants believe that Claims 1 and 4-9 are in condition for allowance. If any issues remain that may be expeditiously addressed in a telephone interview, the Examiner is encouraged to telephone applicants' attorney at 206.695.1755.

Respectfully submitted,

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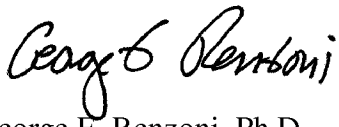

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